

PATENT COOPERATION TREATY

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From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2005/050000

International filing date (day/month/year)
03.01.2005

Priority date (day/month/year)
12.01.2004

International Patent Classification (IPC) or both national classification and IPC
B01J31/18, B01J31/04, C07F13/00, C07D213/22, C07D401/14, C11D3/39, C11D11/02, C11D17/06, D06L3/02,

Applicant
CIBA SPECIALTY CHEMICALS HOLDING INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2005/050000

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☐ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☒ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:
see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2005/050000

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the International application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-9, 12-15 (all part)

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------------|
| Novelty (N) | Yes: Claims | 1-9, 12-25 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 1-9, 12-25 |
| Industrial applicability (IA) | Yes: Claims | 1-9, 12-12 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2005/050000

Box No. VI Certain documents cited

1. Certain published documents (Rules 43*bis*.1 and 70.10)
and /or
2. Non-written disclosures (Rules 43*bis*.1 and 70.9)
see form 210

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Clarity and Support by the Description:

1. The subject-matter to be protected in claim 1 is **not clearly defined**, due to the **concatenation of "and/or" options**, it being not clear which options are principal alternatives and which are alternatives nested within some of the principal alternatives, and further to the **inconsistency with the description** on pages 1, lines 4-5 and 3, lines 15-16. With respect to the latter, the wording in said description passages implies the following principal options: (i): peroxy acids and/or their precursors, **or** (ii) H_2O_2 and/or its precursors. This is inconsistent with claim 1, as far as it may be understood on its own, in at least two respects, namely that **neither precursors of organic peroxy acids nor H_2O_2 are included as stand-alone oxidants according to the claim**, no matter which nesting is defined, due to the **definite "and" preceding " H_2O_2 "**.

In addition, some of the options included by the wording of claim 1 and the said inconsistent definition in the description find **no support** in the description parts relating to the oxidant to be used and formulations comprising it (cf. page 18, line 18 to page 23, line 7; page 25, line 31 to page 28, line 34; page 31, line 24 to page 32, line 5; application examples 1-4). The only **options for mandatory oxidants** finding support in the description are thus:

- (1) peroxy acids;
- (2) peroxy acid precursors **in combination with H_2O_2** ;
- (3) peroxy acid precursors **in combination with precursors of H_2O_2** ;
- (4) any combination of the options (1)-(3).

These options are also the only options according to independent detergent product claim 23, which, in contrast to claim 1, is clearly formulated with respect to the oxidant feature. Since this selection of oxidants appears to be an essential feature of the invention, it must be included in all independent claims (cf. Art. 6 PCT in combination with Rule 6.3(b) PCT: **any** independent claim must contain **all** the technical features essential to the definition of the invention).

For the present purposes, claim 1 is construed as being restricted to said options (1)-(4).

2. Independent claim 23 and its corresponding passage on page 26, lines 6-18 of the description are **inconsistent**, the latter being broader in scope than the claim, since the restrictions imposed by the reference to claims 14-17 are not reflected therein, rather only in the subsequently listed preferred compositions on page 26, line 20 to page 28, line 34. The **true scope** of the claim is thus **not clear** (Art. 6 PCT).

For the present purposes, the restricted definition in claim 23 is exclusively used.

3. Independent claim 24 and its corresponding passage on page 36, lines 13-24 of the description are also **inconsistent**, the individual features being divergent in scope. Thus:
- (i) the form of the formulation must be **granules** according to the description, while this is left open in the claim (generic "solid") and being only optional according to dependent claim 25;
 - (ii) the restrictions for the **oxidant** imposed by the reference to claims 14-17 in claim 24 are not reflected in said passage;
 - (iii) said passage defines a **different restriction** for the oxidant, i.e. *if H₂O₂ is comprised therein, it must be from an inorganic persalt "as described above"* (apparently those from page 31, lines 30-34).

The **true scope** of the claim is thus **not clear** (Art. 6 PCT).

For the present purposes, the definition in claim 24 is exclusively used.

4. The term "**N-mono- or N,N-di-C₁-C₄alkylamino**" is not a clear definition of the intended substituents, since it is **inconsistently used** throughout the claims and the description and hence **ambiguous**. Also, the similar terms "**N-mono- or N,N-di-C₁-C₄alkyl-NR₁₄R₁₅**" and "**N-mono- or N,N-di-C₁-C₄alkyl-N^oR₁₄R₁₅R₁₆**" are **incorrectly used, deviating from the generally accepted definition** and thus also or additionally rendering the **subject-matter to be protected unclear**. These substituents containing substituted amino groups, including heterocycles need to be more consistently defined for clarity of the encompassed compounds and hence the scope of the claim (Art. 6 PCT).

According to the **generally accepted definition** of the above terms in question, "mono" and "di" are the respective multipliers of the immediately following substituent group, i.e. "C₁-C₄ alkyl", respectively "C₁-C₄alkyl-NR₁₄R₁₅", "C₁-C₄alkyl-N^oR₁₄R₁₅R₁₆", which groups are both specified by the locators "N-" and "N,N-", respectively, as residing on **one and the same nitrogen atom**, which in turn is specified as embodied by an "amino" group. Hence this definition is **equivalent to -NHR**, respectively **-NR₂**, with **R** being **C₁-C₄alkyl**, **C₁-C₄alkyl-NR₁₄R₁₅** or **C₁-C₄alkyl-N^oR₁₄R₁₅R₁₆**, respectively.

This **correct definition** appears, however, **only sometimes** to be **applied**, e.g. when designating optional substituents for the phenyl groups as, in turn, optional substituents R₅ (cf. e.g. claim 9, lines 2-4 of the claim and page 6, lines 13-16; claim 12, bridging two lines on pages 83/84) or **sometimes** when designating a direct option for R₅ (cf. claim

12, lines 19-20 on page 83). In contrast thereto, e.g. claims 9 (cf lines 22-32 on page 81), 10 (cf. page 82, lines 3-6 and 9-11) and 11 (cf. page 82, lines 19-22 and page 82, line 25 to page 83, line 1) appear to **alter** the correct definition to designate amines which contain one or two **further** $-NR_{14}R_{15}$, respectively $-NR_{14}R_{15}R_{16}$ amino groups **beside** an unspecified amino group, i.e. a restriction of the substituents $-N(R_{13})-(C_1-C_6 \text{ alkylene})-NR_{14}R_{15}$, $-N[(C_1-C_6 \text{ alkylene})-NR_{14}R_{15}]_2$, $-N(R_{13})-(C_1-C_6 \text{ alkylene})-N^{\circ}R_{14}R_{15}R_{16}$ and $-N[(C_1-C_6 \text{ alkylene})-N^{\circ}R_{14}R_{15}R_{16}]_2$ of claim 1 appears to be intended. This is especially reflected in claims 10-11 and the corresponding definitions on page 7 by the express statement that (at least) **two** amino nitrogens are present, one bonded to one of the rings A, B or C, the other spaced apart from these ("wherein the nitrogen **atoms**, especially the nitrogen **atoms** that are not bonded to one of the rings A, B and/or C..."), **without** a further $N-R_{14}-R_{15}$ ring being involved, i.e. the **second N** must thus be **part of the "N-mono- or N,N-di- C_1-C_4 alkylamino" substituent**. Furthermore, **C_1-C_4 alkylene** units are **preferred** according to the general description (cf. page 5, lines 8-11) and the worked examples. This is therefore the most plausible interpretation for this incorrectly defined structural feature. Other *a priori* conceivable interpretations would e.g. conflict with the conditions that N, R_{14} and R_{15} form a ring, while at the same time two C_1-C_4 alkyl groups are present **and** that the N is bound to e.g. ring B in formulas (2) or (3). Hence, for the present purposes, the said term in claims 9-11, 13 and in the respective passages of the description is interpreted according to the above explained perceived intention of the applicant, at the same time, the incorrect terminology "alkyl" is interpreted as "**alkylene**", i.e. "**N-mono- or N,N-di- $(C_1-C_4 \text{ alkyleneamino})$ amino**", "**N-mono- or N,N-di- $(C_1-C_4 \text{ alkylene-}NR_{14}R_{15})$ amino**" or "**N-mono- or N,N-di- $(C_1-C_4 \text{ alkylene-}N^{\circ}R_{14}R_{15}R_{16})$ amino**", respectively, with the **optional further substituent on the amino N**, in case of the respective "mono-" substituents being R_{13} **as defined in the independent claim 1**.

5. Claim 14 is **not clear** with respect to the subject-matter to be protected (Art 6 PCT). The claim refers to "**the**" **alkyl chain**, however, **no structure is specified** other than that a generic mono- or polyperoxy acid is involved. The corresponding passage of the description (cf. page 18, lines 18-20) is likewise silent in this respect.

For the present purposes, claim 14 is construed as involving any mono- or polyperoxy acid (precursor) comprising an alkyl chain with 1-20 carbon atoms.

6. Claims 15-17 are **not clear** with respect to the subject-matter to be protected by virtue of the **back references** to any of the preceding claims (Art 6 PCT), although **not all of the features** of all preceding claims are **included**. Thus:
- (i) claim 15, referring also to claim 14, includes *inter alia* **unsubstituted aryl, alkylene-phthalimido** and **alkylene-aryl groups** as R_{18} moieties, which hence do not comprise the C_1 - C_{20} alkyl group specified in claim 14 as mandatory (see item 5 above);
 - (ii) claim 16, likewise referring *inter alia* to claim 14, also contains the option of an **unsubstituted alkylene-phthalimido group linked to the -C(O)-OOM group**, hence lacking the required C_1 - C_{20} alkyl group;
 - (iii) claim 17, referring *inter alia* to claims 15 and 16, includes "**NOBS**" (see below) as peroxy acid **precursor**, which, even as corresponding peroxy acid, neither matches the two alternatives in claim 16 nor the structural formula in claim 15, furthermore no precursors are included in claims 15 and 16.
- The back references in question are therefore **not** taken into account for the present purposes.

Claim 17 is furthermore **inconsistent** with the description (cf. page 21, lines 9-10), in that the latter requires the apparently **more specific** "SNOBS", while requiring only **generic** percarbonate and/or perborate. It is also not clear, whether "NOBS", "Na-NOBS" (cf. page 1, lines 18-19) and "SNOBS" (cf. page 21, lines 10 and page 20, lines 28-31) relate to the same acid moiety. In view of the name given on page 1 and the structural formula on page 20, "SNOBS" and "Na-NOBS" are assumed to be the same, i.e. the sodium sulfonate salt. Since **no explanations** whatsoever are given for "NOBS" and it is **not clear**, whether the same substance as above is involved, or possibly the free acid or a different (generic?) salt, the term "NOBS" in claim 17 is interpreted as "SNOBS" in construing the claim as above.

7. It is **not clear** in claim 12, whether the **parentheses** are intended as facultative or mandatory limitations of the respective following structural feature (Art. 6 PCT). The former is assumed for the present purposes.
8. The **facultative features** in claims 5-7, 23 and 24 do not limit the claimed subject-matter in any way and would need to be redrafted as separate claims for that purpose (Art. 6 PCT).

Priority:

1. The present claim set is **not entirely** covered by the priority document (hereinafter "**P**") drawn upon (Art. 8(2)(a) PCT, Art. 4 Paris Convention; see also decision G 2/98 of the EPO Enlarged Board of Appeal). In particular the **specific combination of (S)NOBS and/or TAED with the H₂O₂ precursors Na-percarbonate and/or Na-perborate**, according to claim 17, and the generic use of the formula (1) complexes in **automatic dishwashing formulations**, according to claim 21, find no basis in **P**.
With respect to claim 17, only a list of **generic** inorganic peroxides, including *inter alla* perborate and percarbonate is disclosed in **P**, hence at least a two-fold selection must be made for the peroxides alone. The **same applies** for the defined peroxy acid precursors (S)NOBS and TAED, *mutatis mutandis*.
With respect to claim 21, **P** is completely **silent** on automatic dishwashing formulations.
2. Therefore, the right to priority is **not valid** for claims 17 and 21 as a **whole**, as well as for **those parts** of claims 18-25 which depend on to claim 17.
3. As a consequence, **intermediate** documents **D2** and **D5** (see section Certain Documents Cited) are **prior art** in the PCT procedure **for those parts** of the present application **which do not enjoy the right to priority** (cf. Rules 43bis.1(b), 64.1, 65.1 and 65.2 PCT).

Lack of Unity of Invention:

1. This authority considers that the present application relates to multiple inventions covered by the claims as indicated below. The reasons for which the **inventions are not so linked as to form a single general inventive concept**, as required by Rule 13.1 PCT, and hence the **application lacks unity of invention**, as required by Art. 3(4)(iii) PCT, are as follows:
 - (i) The **common concept** linking the independent claims 1, 23 and 24 and the various alternatives encompassed therein is the use of a generic complex of formula (1), comprising a **ligand of Markush formula (2)**, as catalyst in oxidation reactions with (A) organic peroxy acids and/or (B) precursors of organic peroxy acids, the latter in combination with (B-1) H₂O₂ and/or (B-2) a precursor of H₂O₂, in particular for detergent, cleaning, disinfecting or bleaching compositions. The

ligand of formula (2) is an optionally substituted bis(pyridyl)azaaryl ligand, wherein Q_1 and Q_2 are variable ring members in the azacycle, which may be independently either N or CR₁₀.

- (ii) This common concept is, however, **not novel**, see document D1. As already acknowledged in the present application, the **same ligands/complexes as presently defined** (cf. formula (1): Me, X, Y, n, m, p, q, z identical; in formula (2): Q_1 , Q_2 = CR₁₀, CR₁₁; R₁₀, R₁₁ largely overlapping in definition, as are R₃ -R₃; R₂ -R₆ being identical) are disclosed therein. Moreover, as not mentioned in the present application, they are used in D1 for the **same broad scope of oxidation reactions and compositions** as presently envisioned. In particular, the actual oxidant may be an inorganic or organic peroxide, with **organic peroxy acids** being expressly mentioned (e.g. phthalimidoperoxycaproic acid, corresponding to "PAP" as used in present application example 3) and preferred embodiments of organic peroxides. Similarly, **mixtures of H₂O₂** (by reference to "perhydrolysis", used in the same way in the present application, cf. pages 28-29, bridging para.) and **precursors of organic peroxy acids** are expressly mentioned, such as the **mixture of H₂O₂ and TAED** (cf. present application example 4).
- (iii) Therefore, no single general inventive concept under Rule 13.1 and 13.3 PCT, expressed by one or more same or corresponding special technical features **providing a contribution over the prior art**, as required by Rule 13.2 PCT, is present, since no such latter features are found.
2. Hence this authority considers that the following separate inventions or groups of inventions are not so linked as to form a single general inventive concept:

Group 1: claims 1-9, 12-25 (all part), insofar as relating to the use of at least one metal complex of formula (1), comprising a ligand of formula (2) wherein **both of Q_1 and Q_2 are N**, as catalysts for oxidation reactions with (A) organic peroxy acids and/or (B) precursors of organic peroxy acids, the latter in combination with (B-1) H₂O₂ and/or (B-2) a precursor of H₂O₂; detergent, cleaning, disinfecting or bleaching compositions comprising the metal complexes of formula (1) and specified oxidant systems (A, B); solid formulations

comprising the metal complexes of formula (1) and the same specified oxidant systems (A, B).

Group 2: claims **1-9, 12-25** (all part), insofar as relating to the use of at least one metal complex of formula (1), comprising a ligand of formula (2) wherein **one of Q₁ and Q₂ is N, the other being CR₃ or CR₂**, as catalysts for oxidation reactions with (A) organic peroxy acids and/or (B) precursors of organic peroxy acids, the latter in combination with (B-1) H₂O₂ and/or (B-2) a precursor of H₂O₂; detergent, cleaning, disinfecting or bleaching compositions comprising the metal complexes of formula (1) and specified oxidant systems (A, B); solid formulations comprising the metal complexes of formula (1) and the same specified oxidant systems (A, B).

Group 3: claims **1-9** (part), **10-11** (whole), **14-25** (part), insofar as relating to the use of at least one metal complex of formula (1), comprising a ligand of formula (2) wherein **both of Q₁ and Q₂ are CR₃ or CR₂**, as catalysts for oxidation reactions with (A) organic peroxy acids and/or (B) precursors of organic peroxy acids, the latter in combination with (B-1) H₂O₂ and/or (B-2) a precursor of H₂O₂; detergent, cleaning, disinfecting or bleaching compositions comprising the metal complexes of formula (1) and specified oxidant systems (A, B); solid formulations comprising the metal complexes of formula (1) and the same specified oxidant systems (A, B).

3. Since **no further search fees have been paid**, the **subject of this examination** by this authority is **exclusively** the (groups of) inventions first mentioned in the claims, i.e. those covered by above **Group 1** (cf. Art. 17(3)(a) and Rules 43bis.1(b), 66.1(e) PCT).

Documents Cited:

Reference is made to the following documents (**D1-D11**), cited in the search report; the numbering will be adhered to in the rest of the procedure:

- D1:** WO 02/088289 A (SCHLINGLOFF GUNTHER ; WEINGARTNER PETER (CH); HAZENKAMP MENNO (CH); CI) 7 November 2002 (2002-11-07)
D2: WO 2004/039934 A (SCHLINGLOFF GUNTHER ; DANNACHER JOSEF (CH);

- HAZENKAMP MENNO (CH); CIBA) **13 May 2004** (2004-05-13)
- D3:** PATENT ABSTRACTS OF JAPAN vol. 1999, no. 05, 31 May 1999 (1999-05-31)
-& JP 11 050096 A (LION CORP), 23 February 1999 (1999-02-23)
- D4:** WO 01/05925 A (CIBA SPECIALTY CHEMICALS HOLDING INC; BACHMANN, FRANK; DANNACHER, JOSE) 25 January 2001 (2001-01-25)
- D5:** WO 2004/104155 A (CIBA SPECIALTY CHEMICALS HOLDING INC; HAZENKAMP, MENNO; KVITA, PETR; N) **2 December 2004** (2004-12-02)
- D6:** US-B-6 610 6411 (NUEHLEN DANIELA ET AL) 26 August 2003 (2003-08-26)
- D7:** US-A-3 912 648 (BRADY THOMAS EUGENE ET AL) 14 October 1975 (1975-10-14)
- D8:** DE 197 26 241 A (CALL KRIMHILD) 24 December 1998 (1998-12-24)
- D9:** WO 97/48786 A (CALL HANS PETER) 24 December 1997 (1997-12-24)
- D10:** DATABASE WPI Week 0234 Derwent Publications Ltd., London, GB; AN 2002-304051 XP002289406
& WO 02/14254 A (JAPAN SCI & TECHNOLOGY CORP) 21 February 2002 (2002-02-21)
- D11:** US-A-5 268 477 (MCCALL JOHN M ET AL) 7 December 1993 (1993-12-07).

Document **D1** is also mentioned in the application. **D2** and **D5** are **intermediate documents** (see sections Priority and Certain Documents Cited). A **computer translation** of **D3**, available from the JPO's internet site, is also tentatively relied upon for the sections below.

Unless indicated otherwise, the **respective passages** cited with the individual documents in the search report **apply** in assessing these documents in the individual sections below.

Novelty:

1. Document **D1** may be considered as **closest prior art** for independent claims **1**, **23** and **24**, as well as for claims **1/21** (cf. **D1**: page 25, paras. 4-6), **not entitled to priority** (see that section). As detailed in the section Lack of Unity of Invention, the only **difference** in subject-matter is that **Q_1 , Q_2 are not N** , in the otherwise same ligand and complexes, rather being **CR_{10} , CR_{11}** .
2. Document **D2** (see detailed analysis in section Certain Documents Cited) may be con-

sidered as closest prior art for claims 1/17, **not entitled to priority** (see that section). The subject-matter in claim 17 **differs** from that of D2 in that the **individual components (S)NOBS, TAED must be selected, as well as** the individual peroxides **Na-perborate, Na-percarbonate**.

Hence claims 18-25, when referring to claim 17, also comprise **novel** subject-matter vs. D2.

3. Either of documents D3 or D4 may also be considered as relevant prior art for claims 1/21, **not entitled to priority** (see that section). Both documents disclose **automatic dishwasher formulations** comprising complexes of **nitrogen ligands (tripodal Schiff-base ligands, exclusively (D4) or co-preferred with other tripodal ligands (D3))** with the **same metals (D3: pref. Mn, Fe, Cu; D4: pref. Mn, Fe)**. The oxidant may be a peroxy acid (D3, D4: **mono- or polyperoxo acids, inter alia** PAP, peroxybenzoic acid) or its precursor (D3: *inter alia* alkyloxyloxy-benzenesulfonic acids, in particular SNOBS; D4: pref. TAED, also SNOBS), the latter in combination with an **inorganic peroxide** as H₂O₂ precursor (D3: pref. **Na-perborate, Na-percarbonate**, K-persulfate; D4: pref. perborates). The subject-matter in claim 21 **differs** from that of D3 or D4 principally in that a **different nitrogen ligand** is specified, i.e. that of claim 1.
4. The subject-matter of claims 1-9 and 12-25, as presently interpreted (see Clarity), is therefore **novel** (Art. 33(2) and Rules 43bis.1(b) and 64.1-64.3 PCT).

Inventive Step:

1. The **problem to be solved** vs. D1 may be seen as to provide **alternative oxidation catalysts**, in particular for bleaching compositions in laundry detergents.
 - 1.1 However, it is at present not verifiable that this problem is indeed solved, since any **application examples** whatsoever are **missing**. These are needed, since **effects of chemical compounds are drawn upon** in establishing an inventive step. The further features of the compositions in claims 23-24 are customary in the art, any novel and inventive problem cannot be derived therefrom.

Moreover, metal complexes with **unsubstituted ligands, i.e. R₁-R₁₁=H**, are presently included in all independent claims. The analogous complexes/ligands with Q₁, Q₂= CR₁₀,

CR₁₁ are, however, stated and shown to be **unsuitable as oxidation catalysts** for the envisioned purpose in **D1** (cf. application examples & tables 3, 5: no appreciable bleaching effect, H₂O₂ decomposition is catalyzed instead). If the present ligands should likewise be essentially inactive when unsubstituted, as **conceivable** in view of **D1** and the similarity of the ligands and chemical reactions involved, the present application likewise not preferring unsubstituted ligands, especially R₅ unsubstituted ones, then this would amount to a **foreseeable disadvantage without any compensatory effect**, hence **without inventive merit**. The same conclusions may be drawn from the application examples of **D2**, since exclusively 4-OH or 4-NH₂ substituted triazine cores are present in the ligands used (with nonetheless **weak catalytic effect**, cf. Table 1)

- 1.2 Therefore, the only problem credibly solved by the present subject-matter **over the whole claimed range** may be formulated as merely providing (detergents and similar compositions comprising) further metal complexes, with **any or no effect** as oxidation/bleaching catalysts. Clearly any metal complex would solve this problem, hence the particular solution presently defined would be an **arbitrary choice** (cf. EPO Boards of Appeal case law, notably decision T 939/92).
- 1.3 The subject-matter of the dependent claims **2-9, 12-22** and **25** does not alleviate this deficiency by virtue of the **missing application examples** leading to the same conclusion as above, *mutatis mutandis*.
2. The **problem to be solved** vs. **D2** with respect to claim **17** and claims **18-20** and **22-25**, when dependent on claim **17**, may be seen as to provide a **further oxidant system** for the same complexes as oxidation catalysts for the same purposes, in particular for bleaching compositions in laundry detergents.
 - 2.1 As set out in item 1.1, application examples are missing, hence any (unexpected) **effects** of the performed selection **cannot be ascertained**.
 - 2.2 Therefore that subject-matter would appear to be **foreshadowed** by **D2** itself, or in combination with **D1, D3, D4** and/or **D9**. All of these documents disclose manyfold alternatives for the oxidant, the **presently claimed alternative combination** being a **selection of specific components thereof**. In **D2**, only this selection is needed to arrive

at the subject-matter of claims 1/17. Since **D2** teaches that any of these, including the presently claimed ones, will work and in the **absence of a surprising effect**, the **arbitrary selection** of one alternative over another cannot be seen as involving inventive skill.

On the other hand, both **TAED** and **(S)NOBS**, as well as **Na-perborate**, **Na-percarbonate** are **customary in the art**, the former two moreover being **specifically mentioned in the present application in this respect** (cf. page 1), while the latter two fall under the specific "peroxide-containing bleaching agents" mentioned for use with the former. Furthermore, **D1** (cf. page 25, paras. 4-6 in conjunction with page 16, para 3) and **D4** (page 14/15, bridging para.) point to **TAED** as activating additive for **(inorganic) peroxy compounds** in both **laundry (D4: together with generic perborate)** and **(automatic) dishwasher detergent** applications, while **D3** points to **Na-percarbonate** and **Na-perborate** as inorganic peroxide in **(automatic) dishwasher detergent** applications, optionally with **(S)NOBS**. **D9**, using similar **triazine-based ligands** for the same purpose, also mentions the **specific combination** of claim 17 as **typical in the art** (cf. page 1, lines 12-16). In view of these teachings and common general knowledge, the selection from the alternatives in **D2** could even be seen as **straight-forward, i.e. obvious to try**.

3. The **problem to be solved** vs. **D1, D3** or **D4** with respect to claims 1/21 may be seen as to provide **alternative oxidation catalysts** for the same purpose, i.e. **(automatic) dishwasher detergent** applications.
- 3.1 As set out in items 1.1 and 2.1, *mutatis mutandis*, application examples are missing, hence any (unexpected) **effects** of the performed selection **cannot be ascertained**.
- 3.2 Therefore that subject-matter would appear to be **foreshadowed** by any of **D1, D3** or **D4 in combination with D5** (see detailed analysis in section Certain Documents Cited). The known complexes of **D1, D3** or **D4**, as well as the presently defined complexes for the claimed use are all **explicitly comprised** in the alternatives disclosed in **D5**, likewise relating to a multitude of oxidation catalyst uses as defined in the present application. Hence the **presently claimed alternative is a selection from apparently technical equivalents**. Starting from any of **D1, D3** or **D4**, only this selection of a technical equivalent from **D5** is needed to arrive at the subject-matter of claims 1/21. Since **D5** teaches that any of these, including the presently claimed ones, will work and in the

absence of a surprising effect, the arbitrary selection of one alternative over another cannot be seen as involving inventive skill.

The same findings would be reached starting from **D1** and its teaching in light of **D2**, *mutatis mutandis*; the latter likewise **explicitly comprising** the known complexes of **D1**, as well as the presently defined complexes for the claimed use. Again, **only a selection from apparently technical equivalents** would appear involved.

4. The present application does therefore not meet the criterion set forth in Article 33(3) PCT, as the subject-matter in claims **1-9** and **12-25** does **not** appear to involve an **inventive step** (cf. Rules 43bis.1 (b), 65.1 and 65.2 PCT).

5. If **(a)** the presently claimed complexes can indeed be shown to be a **solution** of the above problem (see item 1) **over the whole claimed range and (b)** the claimed **subject-matter is restricted to fall within the scope and definition of the application from which priority is claimed**, then an inventive step within the provisions of Art. 33(3) and Rules 43bis.1 (b), 65.1 and 65.2 PCT could **possibly** be recognized.

The complexes are **not foreshadowed** by **D1** or other available prior art **published before the priority date**. **D1** does **not** mention or suggest the possibility of **s-triazine cores** in L. **D3**, **D4** and **D6** use a **different ligand structure** altogether (**D6**: derived from the triaza macrocycle **TACN**). **D10** does **not** envision the use of organic peroxy acids and has the **wrong orientation** of the two pyridine substituents on the s-triazine core, while conversely defining a **third pyridine substituent** on said core, which is **outside** of the substituent definition in present claim 1. **D7-D9** use s-triazine derived **compounds** as mediators in oxidation reactions, *inter alia* with organic peroxy acids, apparently **no metal complexes** being involved. **D11** discloses only a **compound** falling within the scope of claim 1, for a completely **different** (pharmaceutical) **use**.

Certain Documents Cited:

1. The earlier PCT application **D2** was filed on **21.10.2003** and discloses complexes as defined in present claim 1 with **Q1= N** and **Q2= N** for use as **oxidation catalysts** with pref. **peroxy acids** (e.g. that of pres. appl. exs. 3, "PAP"), or **precursors of peroxy acids** (*inter alia* **TAED**) in combination with **H₂O₂** and/or an **inorganic peroxide**, in all of the presently claimed **uses except automatic dishwasher formulations**. Detergent

compositions comprising these oxidation catalyst systems according to present claims **23-25** are also disclosed.

Although **D2** would be novelty destroying for claims **1-9, 12-16, 18-20** and **22-25**, it is **not** considered as state of the art within the PCT procedure for claims **1-9** and **12-16**, since priority is **validly claimed for those parts** in the present application (see section Priority).

In the regional phase before the EPO, however, **all of D2** will be considered as relevant for **novelty**, insofar as the same designated states are concerned, since it **has** actually entered the regional phase (Arts. 158(1) and (2), 54(3) and (4) EPC). **D2** will furthermore be relevant for **inventive step** (Art. 56 EPC) in respect of **those parts** of the **present application not enjoying** the right to **priority**. The same provisions may apply for other national/regional phases.

2. The earlier PCT application **D5** was filed on **12.05.2004**, claims the priority date of 21.05.2003 and likewise discloses **Mn-complexes with ligands** as defined in present claim 1 with **Q1= N** and **Q2= N** for use as **oxidation catalysts** with pref. **peroxy acids** (e.g. that of pres. appl. exs. 3, "PAP"), or **precursors of peroxy acids** (*inter alia* TAED) **in combination with H₂O₂ and/or an inorganic peroxide** (*inter alia* percarbonate, perborate), in **most** of the presently claimed **uses except automatic dishwasher formulations and paper-making applications**. Detergent compositions comprising these oxidation catalyst systems according to present claims **23-25** are also disclosed.

However, **D5** is only entitled to the priority claim for a **generic transition metal** in the otherwise same complexes of the presently examined group 1 inventions. Hence, **those parts** of the **present application** enjoying the **right to priority** (see section Priority) have an effective filing date **before** that of **D5**. Conversely, **those parts** of the **present application not entitled to priority** have an effective filing date **after** the publication date of **D5**.

Although **D5** would be novelty destroying for claims **1-9, 12-16, 18, 20** and **22-25**, it is **not** considered as **state of the art** within the PCT procedure for claims **1-9, 12-16**, since the priority is **validly claimed** in the **present application** for **those parts** (see section Priority).

In the regional phase before the EPO, **those parts of D5 not enjoying** the right to prio-

riority will *not* be *considered at all*, while D5 will be relevant for novelty and inventive step (Art. 54(2) and 56 EPC) in respect of **those parts** of the **present application** *not* enjoying the right to **priority**. The same provisions may apply for other national/regional phases.

Certain Defects:

Contrary to the requirements of Rule 5.1(a)(ii) and (iii) PCT, the relevant background art disclosed in document D1 is not briefly stated in the description **In a form so that its relevance to the present application subject-matter may be understood**. It is furthermore not recited in the background art section, but rather **hidden** in that it is mentioned only in connection with the ligand/complex synthesis from page 23 onwards.

PATENT COOPERATION TREATY

REC'D 22 MAR 2006

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PCT

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2005/050000

International filing date (day/month/year)
03.01.2005

Priority date (day/month/year)
12.01.2004

International Patent Classification (IPC) or both national classification and IPC
B01J31/18, B01J31/04, C07F13/00, C07D213/22, C07D401/14, C11D3/39, C11D11/02, C11D17/06, D06L3/02,

Applicant
CIBA SPECIALTY CHEMICALS HOLDING INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2005/050000

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☐ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☒ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:
see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2005/050000

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the International application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-9, 12-15 (all part)

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------------|
| Novelty (N) | Yes: Claims | 1-9, 12-25 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 1-9, 12-25 |
| Industrial applicability (IA) | Yes: Claims | 1-9, 12-12 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2005/050000

Box No. VI Certain documents cited

1. Certain published documents (Rules 43*bis*.1 and 70.10)
and /or
2. Non-written disclosures (Rules 43*bis*.1 and 70.9)
see form 210

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Clarity and Support by the Description:

1. The subject-matter to be protected in claim 1 is **not clearly defined**, due to the **concatenation of "and/or" options**, it being not clear which options are principal alternatives and which are alternatives nested within some of the principal alternatives, and further to the **inconsistency with the description** on pages 1, lines 4-5 and 3, lines 15-16. With respect to the latter, the wording in said description passages implies the following principal options: (i): peroxy acids and/or their precursors, **or** (ii) H_2O_2 and/or its precursors. This is inconsistent with claim 1, as far as it may be understood on its own, in at least two respects, namely that **neither precursors of organic peroxy acids nor H_2O_2 are included as stand-alone oxidants according to the claim**, no matter which nesting is defined, due to the **definite "and" preceding " H_2O_2 "**.

In addition, some of the options included by the wording of claim 1 and the said inconsistent definition in the description find **no support** in the description parts relating to the oxidant to be used and formulations comprising it (cf. page 18, line 18 to page 23, line 7; page 25, line 31 to page 28, line 34; page 31, line 24 to page 32, line 5; application examples 1-4). The only **options for mandatory oxidants** finding support in the description are thus:

- (1) peroxy acids;
- (2) peroxy acid precursors **in combination with H_2O_2** ;
- (3) peroxy acid precursors **in combination with precursors of H_2O_2** ;
- (4) any combination of the options (1)-(3).

These options are also the only options according to independent detergent product claim 23, which, in contrast to claim 1, is clearly formulated with respect to the oxidant feature. Since this selection of oxidants appears to be an essential feature of the invention, it must be included in all independent claims (cf. Art. 6 PCT in combination with Rule 6.3(b) PCT: **any independent claim must contain all the technical features essential to the definition of the invention**).

For the present purposes, claim 1 is construed as being restricted to said options (1)-(4).

2. Independent claim 23 and its corresponding passage on page 26, lines 6-18 of the description are **Inconsistent**, the latter being broader in scope than the claim, since the restrictions imposed by the reference to claims 14-17 are not reflected therein, rather only in the subsequently listed preferred compositions on page 26, line 20 to page 28, line 34. The **true scope** of the claim is thus **not clear** (Art. 6 PCT).

For the present purposes, the restricted definition in claim 23 is exclusively used.

3. Independent claim 24 and its corresponding passage on page 36, lines 13-24 of the description are also **inconsistent**, the individual features being divergent in scope. Thus:
- (i) the form of the formulation must be **granules** according to the description, while this is left open in the claim (generic "**solid**") and being only optional according to dependent claim 25;
 - (ii) the restrictions for the **oxidant** imposed by the reference to claims 14-17 in claim 24 are not reflected in said passage;
 - (iii) said passage defines a **different restriction** for the oxidant, i.e. *if H₂O₂ is comprised therein, it must be from an **inorganic persalt** "as described above" (apparently those from page 31, lines 30-34).*

The **true scope** of the claim is thus **not clear** (Art. 6 PCT).

For the present purposes, the definition in claim 24 is exclusively used.

4. The term "**N-mono- or N,N-di-C₁-C₄alkylamino**" is not a clear definition of the intended substituents, since it is **inconsistently used** throughout the claims and the description and hence **ambiguous**. Also, the similar terms "**N-mono- or N,N-di-C₁-C₄alkyl-NR₁₄R₁₅**" and "**N-mono- or N,N-di-C₁-C₄alkyl-N^oR₁₄R₁₅R₁₆**" are **incorrectly used, deviating from the generally accepted definition** and thus also or additionally rendering the **subject-matter to be protected unclear**. These substituents containing substituted amino groups, including heterocycles need to be more consistently defined for clarity of the encompassed compounds and hence the scope of the claim (Art. 6 PCT).

According to the **generally accepted definition** of the above terms in question, "mono" and "di" are the respective multipliers of the immediately following substituent group, i.e. "**C₁-C₄ alkyl**", respectively "**C₁-C₄alkyl-NR₁₄R₁₅**", "**C₁-C₄alkyl-N^oR₁₄R₁₅R₁₆**", which groups are both specified by the locators "N-" and "N,N-", respectively, as residing on **one and the same nitrogen atom**, which in turn is specified as embodied by an "amino" group. Hence this definition is **equivalent to -NHR**, respectively **-NR₂**, with **R** being **C₁-C₄alkyl**, **C₁-C₄alkyl-NR₁₄R₁₅** or **C₁-C₄alkyl-N^oR₁₄R₁₅R₁₆**, respectively.

This **correct definition** appears, however, **only sometimes** to be **applied**, e.g. when designating optional substituents for the phenyl groups as, in turn, optional substituents R₅ (cf. e.g. claim 9, lines 2-4 of the claim and page 6, lines 13-16; claim 12, bridging two lines on pages 83/84) or **sometimes** when designating a direct option for R₅ (cf. claim

12, lines 19-20 on page 83). In contrast thereto, e.g. claims 9 (cf. lines 22-32 on page 81), 10 (cf. page 82, lines 3-6 and 9-11) and 11 (cf. page 82, lines 19-22 and page 82, line 25 to page 83, line 1) appear to *alter* the correct definition to designate amines which contain one or two *further* $-NR_{14}R_{15}$, respectively $-NR_4R_5R_6$ amino groups *beside* an unspecified amino group, i.e. a restriction of the substituents $-N(R_{13})-(C_1-C_6 \text{ alkylene})-NR_{14}R_{15}$, $-N[(C_1-C_6 \text{ alkylene})-NR_{14}R_{15}]_2$, $-N(R_{13})-(C_1-C_6 \text{ alkylene})-N^{\circ}R_{14}R_{15}R_{16}$ and $-N[(C_1-C_6 \text{ alkylene})-N^{\circ}R_{14}R_{15}R_{16}]_2$ of claim 1 appears to be intended. This is especially reflected in claims 10-11 and the corresponding definitions on page 7 by the express statement that (at least) **two** amino nitrogens are present, one bonded to one of the rings A, B or C, the other spaced apart from these ("wherein the nitrogen **atoms**, especially the nitrogen **atoms** that are not bonded to one of the rings A, B and/or C..."), **without** a further $N-R_{14}-R_{15}$ ring being involved, i.e. the **second N** must thus be **part of the "N-mono- or N,N-di- C_1-C_4 alkylamino" substituent**. Furthermore, **C_1-C_4 alkylene** units are **preferred** according to the general description (cf. page 5, lines 8-11) and the worked examples. This is therefore the most plausible interpretation for this incorrectly defined structural feature. Other *a priori* conceivable interpretations would e.g. conflict with the conditions that N, R_{14} and R_{15} form a ring, while at the same time two C_1-C_4 alkyl groups are present and that the N is bound to e.g. ring B in formulas (2) or (3).

Hence, for the present purposes, the said term in claims 9-11, 13 and in the respective passages of the description is interpreted according to the above explained perceived intention of the applicant, at the same time, the incorrect terminology "alkyl" is interpreted as "**alkylene**", i.e. "**N-mono- or N,N-di- $(C_1-C_4 \text{ alkyleneamino})$ amino**", "**N-mono- or N,N-di- $(C_1-C_4 \text{ alkylene-}NR_{14}R_{15})$ amino**" or "**N-mono- or N,N-di- $(C_1-C_4 \text{ alkylene-}N^{\circ}R_{14}R_{15}R_{16})$ -amino**", respectively, with the *optional further substituent on the amino N*, in case of the respective "mono-" substituents being R_{13} *as defined in the independent claim 1*.

5. Claim 14 is **not clear** with respect to the subject-matter to be protected (Art 6 PCT). The claim refers to "**the** **alkyl chain**", however, ***no structure is specified*** other than that a generic mono- or polyperoxy acid is involved. The corresponding passage of the description (cf. page 18, lines 18-20) is likewise silent in this respect.

For the present purposes, claim 14 is construed as involving any mono- or polyperoxy acid (precursor) comprising an alkyl chain with 1-20 carbon atoms.

6. Claims 15-17 are **not clear** with respect to the subject-matter to be protected by virtue of the **back references** to **any** of the preceding claims (Art 6 PCT), although **not all of the features** of all preceding claims are **included**. Thus:
- (i) claim 15, referring also to claim 14, includes *inter alia* **unsubstituted aryl, alkylene-phthalimido** and **alkylene-aryl groups** as R_{18} moieties, which hence do not comprise the C_1 - C_{20} alkyl group specified in claim 14 as mandatory (see item 5 above);
 - (ii) claim 16, likewise referring *inter alia* to claim 14, also contains the option of an **unsubstituted alkylene-phthalimido group linked to the -C(O)-OOM group**, hence lacking the required C_1 - C_{20} alkyl group;
 - (iii) claim 17, referring *inter alia* to claims 15 and 16, includes "**NOBS**" (see below) as peroxy acid **precursor**, which, even as corresponding peroxy acid, neither matches the two alternatives in claim 16 nor the structural formula in claim 15, furthermore no precursors are included in claims 15 and 16.
- The back references in question are therefore **not** taken into account for the present purposes.

Claim 17 is furthermore **inconsistent** with the description (cf. page 21, lines 9-10), in that the latter requires the apparently **more specific** "SNOBS", while requiring only **generic** percarbonate and/or perborate. It is also not clear, whether "NOBS", "Na-NOBS" (cf. page 1, lines 18-19) and "SNOBS" (cf. page 21, lines 10 and page 20, lines 28-31) relate to the same acid moiety. In view of the name given on page 1 and the structural formula on page 20, "SNOBS" and "Na-NOBS" are assumed to be the same, i.e. the sodium sulfonate salt. Since **no explanations** whatsoever are given for "NOBS" and it is **not clear**, whether the same substance as above is involved, or possibly the free acid or a different (generic?) salt, the term "NOBS" in claim 17 is interpreted as "SNOBS" in construing the claim as above.

7. It is **not clear** in claim 12, whether the **parentheses** are intended as facultative or mandatory limitations of the respective following structural feature (Art. 6 PCT). The former is assumed for the present purposes.
8. The **facultative features** in claims 5-7, 23 and 24 do not limit the claimed subject-matter in any way and would need to be redrafted as separate claims for that purpose (Art. 6 PCT).

Priority:

1. The present claim set is **not entirely** covered by the priority document (hereinafter "**P**") drawn upon (Art. 8(2)(a) PCT, Art. 4 Paris Convention; see also decision G 2/98 of the EPO Enlarged Board of Appeal). In particular the **specific combination of (S)NOBS and/or TAED with the H₂O₂ precursors Na-percarbonate and/or Na-perborate**, according to claim 17, and the generic use of the formula (1) complexes in **automatic dishwashing formulations**, according to claim 21, find no basis in **P**.
With respect to claim 17, only a list of **generic** inorganic peroxides, including *inter alla* perborate and percarbonate is disclosed in **P**, hence at least a two-fold selection must be made for the peroxides alone. The **same applies** for the defined peroxy acid precursors (S)NOBS and TAED, *mutatis mutandis*.
With respect to claim 21, **P** is completely **silent** on automatic dishwashing formulations.
2. Therefore, the right to priority is **not valid** for claims 17 and 21 as a **whole**, as well as for **those parts** of claims 18-25 which depend on to claim 17.
3. As a consequence, **intermediate** documents **D2** and **D5** (see section Certain Documents Cited) are **prior art** in the PCT procedure for **those parts** of the present application which do not enjoy the right to priority (cf. Rules 43bis.1(b), 64.1, 65.1 and 65.2 PCT).

Lack of Unity of Invention:

1. This authority considers that the present application relates to multiple inventions covered by the claims as indicated below. The reasons for which the **inventions** are **not so linked as to form a single general inventive concept**, as required by Rule 13.1 PCT, and hence the **application lacks unity of invention**, as required by Art. 3(4)(iii) PCT, are as follows:
 - (i) The **common concept** linking the independent claims 1, 23 and 24 and the various alternatives encompassed therein is the use of a generic complex of formula (1), comprising a **ligand of Markush formula (2)**, as catalyst in oxidation reactions with (A) organic peroxy acids and/or (B) precursors of organic peroxy acids, the latter in combination with (B-1) H₂O₂ and/or (B-2) a precursor of H₂O₂, in particular for detergent, cleaning, disinfecting or bleaching compositions. The

ligand of formula (2) is an optionally substituted bis(pyridyl)azaaryl ligand, wherein Q_1 and Q_2 are variable ring members in the azacycle, which may be independently either N or CR_{10} .

- (ii) This common concept is, however, **not novel**, see document **D1**. As already acknowledged in the present application, the **same ligands/complexes as presently defined** (cf. formula (1): Me, X, Y, n, m, p, q, z identical; in formula (2): Q_1 , $Q_2 = CR_{10}$, CR_{11} ; R_{10} , R_{11} largely overlapping in definition, as are $R_1 - R_3$; $R_{12} - R_{16}$ being identical) are disclosed therein. Moreover, as not mentioned in the present application, they are used in **D1** for the **same broad scope of oxidation reactions and compositions** as presently envisioned. In particular, the actual oxidant may be an inorganic or organic peroxide, with **organic peroxy acids** being expressly mentioned (e.g. phthalimidoperoxycaproic acid, corresponding to "**PAP**" as used in present application example 3) and preferred embodiments of organic peroxides. Similarly, **mixtures of H_2O_2** (by reference to "perhydrolysis", used in the same way in the present application, cf. pages 28-29, bridging para.) and **precursors of organic peroxy acids** are expressly mentioned, such as the **mixture of H_2O_2 and TAED** (cf. present application example 4).
- (iii) Therefore, no single general inventive concept under Rule 13.1 and 13.3 PCT, expressed by one or more same or corresponding special technical features **providing a contribution over the prior art**, as required by Rule 13.2 PCT, is present, since no such latter features are found.
2. Hence this authority considers that the following separate inventions or groups of inventions are not so linked as to form a single general inventive concept:

Group 1: claims **1-9, 12-25** (all part), insofar as relating to the use of at least one metal complex of formula (1), comprising a ligand of formula (2) wherein **both of Q_1 and Q_2 are N**, as catalysts for oxidation reactions with (A) organic peroxy acids and/or (B) precursors of organic peroxy acids, the latter in combination with (B-1) H_2O_2 and/or (B-2) a precursor of H_2O_2 ; detergent, cleaning, disinfecting or bleaching compositions comprising the metal complexes of formula (1) and specified oxidant systems (A, B); solid formulations

comprising the metal complexes of formula (1) and the same specified oxidant systems (A, B).

Group 2: claims **1-9, 12-25** (all part), insofar as relating to the use of at least one metal complex of formula (1), comprising a ligand of formula (2) wherein **one of Q_1 and Q_2 is N, the other being CR or CR** , as catalysts for oxidation reactions with (A) organic peroxy acids and/or (B) precursors of organic peroxy acids, the latter in combination with (B-1) H_2O_2 and/or (B-2) a precursor of H_2O_2 ; detergent, cleaning, disinfecting or bleaching compositions comprising the metal complexes of formula (1) and specified oxidant systems (A, B); solid formulations comprising the metal complexes of formula (1) and the same specified oxidant systems (A, B).

Group 3: claims **1-9** (part), **10-11** (whole), **14-25** (part), insofar as relating to the use of at least one metal complex of formula (1), comprising a ligand of formula (2) wherein **both of Q_1 and Q_2 are CR or CR** , as catalysts for oxidation reactions with (A) organic peroxy acids and/or (B) precursors of organic peroxy acids, the latter in combination with (B-1) H_2O_2 and/or (B-2) a precursor of H_2O_2 ; detergent, cleaning, disinfecting or bleaching compositions comprising the metal complexes of formula (1) and specified oxidant systems (A, B); solid formulations comprising the metal complexes of formula (1) and the same specified oxidant systems (A, B).

3. Since **no further search fees have been paid**, the **subject of this examination** by this authority is **exclusively** the (groups of) inventions first mentioned in the claims, i.e. those covered by above **Group 1** (cf. Art. 17(3)(a) and Rules 43bis.1(b), 66.1(e) PCT).

Documents Cited:

Reference is made to the following documents (**D1-D11**), cited in the search report; the numbering will be adhered to in the rest of the procedure:

- D1:** WO 02/088289 A (SCHLINGLOFF GUNTHER ; WEINGARTNER PETER (CH); HAZENKAMP MENNO (CH); Cl) 7 November 2002 (2002-11-07)
D2: WO 2004/039934 A (SCHLINGLOFF GUNTHER ; DANNACHER JOSEF (CH);

- HAZENKAMP MENNO (CH); CIBA) **13 May 2004** (2004-05-13)
- D3:** PATENT ABSTRACTS OF JAPAN vol. 1999, no. 05, 31 May 1999 (1999-05-31)
-& JP 11 050096 A (LION CORP), 23 February 1999 (1999-02-23)
- D4:** WO 01/05925 A (CIBA SPECIALTY CHEMICALS HOLDING INC; BACHMANN,
FRANK; DANNACHER, JOSE) 25 January 2001 (2001-01-25)
- D5:** WO 2004/104155 A (CIBA SPECIALTY CHEMICALS HOLDING INC;
HAZENKAMP, MENNO; KVITA, PETR; N) **2 December 2004** (2004-12-02)
- D6:** US-B-6 610 6411 (NUEHLEN DANIELA ET AL) 26 August 2003 (2003-08-26)
- D7:** US-A-3 912 648 (BRADY THOMAS EUGENE ET AL) 14 October 1975 (1975-10-14)
- D8:** DE 197 26 241 A (CALL KRIMHILD) 24 December 1998 (1998-12-24)
- D9:** WO 97/48786 A (CALL HANS PETER) 24 December 1997 (1997-12-24)
- D10:** DATABASE WPI Week 0234 Derwent Publications Ltd., London, GB; AN 2002-304051 XP002289406
& WO 02/14254 A (JAPAN SCI & TECHNOLOGY CORP) 21 February 2002 (2002-02-21)
- D11:** US-A-5 268 477 (MCCALL JOHN M ET AL) 7 December 1993 (1993-12-07).

Document **D1** is also mentioned in the application. **D2** and **D5** are **intermediate documents** (see sections Priority and Certain Documents Cited). A **computer translation** of **D3**, available from the JPO's internet site, is also tentatively relied upon for the sections below.

Unless indicated otherwise, the **respective passages** cited with the individual documents in the search report **apply** in assessing these documents in the individual sections below.

Novelty:

1. Document **D1** may be considered as **closest prior art** for independent claims **1, 23** and **24**, as well as for claims **1/21** (cf. **D1**: page 25, paras. 4-6), **not entitled to priority** (see that section). As detailed in the section Lack of Unity of Invention, the only **difference** in subject-matter is that **Q_1 , Q_2 are not N** , in the otherwise same ligand and complexes, rather being **CR_{10} , CR_{11}** .
2. Document **D2** (see detailed analysis in section Certain Documents Cited) may be con-

sidered as closest prior art for claims 1/17, **not entitled to priority** (see that section). The subject-matter in claim 17 **differs** from that of D2 in that the **individual components (S)NOBS, TAED must be selected, as well as** the individual peroxides **Na-perborate, Na-percarbonate**.

Hence claims 18-25, when referring to claim 17, also comprise **novel** subject-matter vs. D2.

3. Either of documents D3 or D4 may also be considered as relevant prior art for claims 1/21, **not entitled to priority** (see that section). Both documents disclose **automatic dishwasher formulations** comprising complexes of **nitrogen ligands (tripodal Schiff-base ligands, exclusively (D4) or co-preferred with other tripodal ligands (D3))** with the **same metals (D3: pref. Mn, Fe, Cu; D4: pref. Mn, Fe)**. The oxidant may be a peroxy acid (D3, D4: **mono- or polyperoxo acids, inter alia PAP, peroxybenzoic acid**) or its precursor (D3: *inter alia* alkyloxy-benzenesulfonic acids, in particular **SNOBS; D4: pref. TAED, also SNOBS**), the latter in combination with an **inorganic peroxide** as H₂O₂ precursor (D3: pref. **Na-perborate, Na-percarbonate, K-persulfate; D4: pref. perborates**). The subject-matter in claim 21 **differs** from that of D3 or D4 principally in that a **different nitrogen ligand** is specified, i.e. that of claim 1.
4. The subject-matter of claims 1-9 and 12-25, as presently interpreted (see Clarity), is therefore **novel** (Art. 33(2) and Rules 43bis.1(b) and 64.1-64.3 PCT).

Inventive Step:

1. The **problem to be solved** vs. D1 may be seen as to provide **alternative oxidation catalysts**, in particular for bleaching compositions in laundry detergents.
 - 1.1 However, it is at present not verifiable that this problem is indeed solved, since any **application examples** whatsoever are **missing**. These are needed, since **effects of chemical compounds are drawn upon** in establishing an inventive step. The further features of the compositions in claims 23-24 are customary in the art, any novel and inventive problem cannot be derived therefrom.

Moreover, metal complexes with **unsubstituted ligands, i.e. R₁-R₁₁= H**, are presently included in all independent claims. The analogous complexes/ligands with Q₁, Q₂= CR₁₀,

CR₁₁ are, however, stated and shown to be **unsuitable as oxidation catalysts** for the envisioned purpose in **D1** (cf. application examples & tables 3, 5: no appreciable bleaching effect, H₂O₂ decomposition is catalyzed instead). If the present ligands should likewise be essentially inactive when unsubstituted, as **conceivable** in view of **D1** and the similarity of the ligands and chemical reactions involved, the present application likewise not preferring unsubstituted ligands, especially R₅ unsubstituted ones, then this would amount to a **foreseeable disadvantage without any compensatory effect**, hence **without inventive merit**. The same conclusions may be drawn from the application examples of **D2**, since exclusively 4-OH or 4-NH₂ substituted triazine cores are present in the ligands used (with nonetheless **weak catalytic effect**, cf. Table 1)

- 1.2 Therefore, the only problem credibly solved by the present subject-matter **over the whole claimed range** may be formulated as merely providing (detergents and similar compositions comprising) further metal complexes, with **any or no effect** as oxidation/bleaching catalysts. Clearly any metal complex would solve this problem, hence the particular solution presently defined would be an **arbitrary choice** (cf. EPO Boards of Appeal case law, notably decision T 939/92).
- 1.3 The subject-matter of the dependent claims **2-9, 12-22** and **25** does not alleviate this deficiency by virtue of the **missing application examples** leading to the same conclusion as above, *mutatis mutandis*.
2. The **problem to be solved** vs. **D2** with respect to claim **17** and claims **18-20** and **22-25**, when dependent on claim **17**, may be seen as to provide a **further oxidant system** for the same complexes as oxidation catalysts for the same purposes, in particular for bleaching compositions in laundry detergents.
 - 2.1 As set out in item 1.1, application examples are missing, hence any (unexpected) **effects** of the performed selection **cannot be ascertained**.
 - 2.2 Therefore that subject-matter would appear to be **foreshadowed** by **D2** itself, or in combination with **D1, D3, D4** and/or **D9**. All of these documents disclose manyfold alternatives for the oxidant, the **presently claimed alternative combination** being a **selection of specific components thereof**. In **D2**, only this selection is needed to arrive

at the subject-matter of claims 1/17. Since **D2** teaches that any of these, including the presently claimed ones, will work and in the **absence of a surprising effect**, the **arbitrary selection** of one alternative over another cannot be seen as involving inventive skill.

On the other hand, both **TAED** and **(S)NOBS**, as well as **Na-perborate**, **Na-percarbonate** are **customary in the art**, the former two moreover being **specifically mentioned in the present application in this respect** (cf. page 1), while the latter two fall under the specific "peroxide-containing bleaching agents" mentioned for use with the former. Furthermore, **D1** (cf. page 25, paras. 4-6 in conjunction with page 16, para 3) and **D4** (page 14/15, bridging para.) point to **TAED** as activating additive for **(inorganic) peroxy compounds** in both **laundry (D4: together with generic perborate)** and **(automatic) dishwasher detergent** applications, while **D3** points to **Na-percarbonate** and **Na-perborate** as inorganic peroxide in **(automatic) dishwasher detergent** applications, optionally with **(S)NOBS**. **D9**, using similar **triazine-based ligands** for the same purpose, also mentions the **specific combination** of claim 17 as **typical in the art** (cf. page 1, lines 12-16). In view of these teachings and common general knowledge, the selection from the alternatives in **D2** could even be seen as **straight-forward, i.e. obvious to try**.

3. The **problem to be solved** vs. **D1, D3** or **D4** with respect to claims 1/21 may be seen as to provide **alternative oxidation catalysts** for the same purpose, i.e. **(automatic) dishwasher detergent** applications.
- 3.1 As set out in items 1.1 and 2.1, *mutatis mutandis*, application examples are missing, hence any (unexpected) **effects** of the performed selection **cannot be ascertained**.
- 3.2 Therefore that subject-matter would appear to be **foreshadowed** by any of **D1, D3** or **D4 in combination with D5** (see detailed analysis in section Certain Documents Cited). The known complexes of **D1, D3** or **D4**, as well as the presently defined complexes for the claimed use are all **explicitly comprised** in the alternatives disclosed in **D5**, likewise relating to a multitude of oxidation catalyst uses as defined in the present application. Hence the **presently claimed alternative is a selection from apparently technical equivalents**. Starting from any of **D1, D3** or **D4**, only this selection of a technical equivalent from **D5** is needed to arrive at the subject-matter of claims 1/21. Since **D5** teaches that any of these, including the presently claimed ones, will work and in the

absence of a surprising effect, the arbitrary selection of one alternative over another cannot be seen as involving inventive skill.

The same findings would be reached starting from D1 and its teaching in light of D2, *mutatis mutandis*; the latter likewise explicitly comprising the known complexes of D1, as well as the presently defined complexes for the claimed use. Again, only a selection from apparently technical equivalents would appear involved.

4. The present application does therefore not meet the criterion set forth in Article 33(3) PCT, as the subject-matter in claims 1-9 and 12-25 does not appear to involve an inventive step (cf. Rules 43bis.1(b), 65.1 and 65.2 PCT).

5. If (a) the presently claimed complexes can indeed be shown to be a solution of the above problem (see item 1) over the whole claimed range and (b) the claimed subject-matter is restricted to fall within the scope and definition of the application from which priority is claimed, then an inventive step within the provisions of Art. 33(3) and Rules 43bis.1(b), 65.1 and 65.2 PCT could possibly be recognized.

The complexes are not foreshadowed by D1 or other available prior art published before the priority date. D1 does not mention or suggest the possibility of *s*-triazine cores in L. D3, D4 and D6 use a different ligand structure altogether (D6: derived from the triaza macrocycle TACN). D10 does not envision the use of organic peroxy acids and has the wrong orientation of the two pyridine substituents on the *s*-triazine core, while conversely defining a third pyridine substituent on said core, which is outside of the substituent definition in present claim 1. D7-D9 use *s*-triazine derived compounds as mediators in oxidation reactions, *inter alia* with organic peroxy acids, apparently no metal complexes being involved. D11 discloses only a compound falling within the scope of claim 1, for a completely different (pharmaceutical) use.

Certain Documents Cited:

1. The earlier PCT application D2 was filed on 21.10.2003 and discloses complexes as defined in present claim 1 with Q1= N and Q2= N for use as oxidation catalysts with pref. peroxy acids (e.g. that of pres. appl. exs. 3, "PAP"), or precursors of peroxy acids (inter alia TAED) in combination with H₂O₂ and/or an inorganic peroxide, in all of the presently claimed uses except automatic dishwasher formulations. Detergent

compositions comprising these oxidation catalyst systems according to present claims **23-25** are also disclosed.

Although **D2** would be novelty destroying for claims **1-9, 12-16, 18-20** and **22-25**, it is **not** considered as state of the art within the PCT procedure for claims **1-9** and **12-16**, since priority is **validly** claimed for **those parts** in the present application (see section Priority).

In the regional phase before the EPO, however, **all of D2** will be considered as relevant for **novelty**, insofar as the same designated states are concerned, since it **has** actually entered the regional phase (Arts. 158(1) and (2), 54(3) and (4) EPC). **D2** will furthermore be relevant for **inventive step** (Art. 56 EPC) in respect of **those parts** of the **present application not enjoying** the right to **priority**. The same provisions may apply for other national/regional phases.

2. The earlier PCT application **D5** was filed on **12.05.2004**, claims the priority date of 21.05.2003 and likewise discloses **Mn-complexes** with **ligands** as defined in present claim 1 with **Q1= N** and **Q2= N** for use as **oxidation catalysts** with pref. **peroxy acids** (e.g. that of pres. appl. exs. 3, "PAP"), or **precursors of peroxy acids** (*inter alia* TAED) in **combination with H₂O₂ and/or an inorganic peroxide** (*inter alia* percarbonate, perborate), in **most** of the presently claimed **uses except automatic dishwasher formulations and paper-making applications**. Detergent compositions comprising these oxidation catalyst systems according to present claims **23-25** are also disclosed.

However, **D5** is only entitled to the priority claim for a **generic transition metal** in the otherwise same complexes of the presently examined group 1 inventions. Hence, **those parts** of the **present application** enjoying the **right to priority** (see section Priority) have an effective filing date **before** that of **D5**. Conversely, **those parts** of the **present application not entitled to priority** have an effective filing date **after** the publication date of **D5**.

Although **D5** would be novelty destroying for claims **1-9, 12-16, 18, 20** and **22-25**, it is **not** considered as **state of the art** within the PCT procedure for claims **1-9, 12-16**, since the priority is **validly** claimed in the **present application** for **those parts** (see section Priority).

In the regional phase before the EPO, **those parts of D5 not enjoying** the right to prio-

urity will *not* be *considered at all*, while D5 will be relevant for novelty and inventive step (Art. 54(2) and 56 EPC) in respect of those parts of the present application *not* enjoying the right to priority. The same provisions may apply for other national/regional phases.

Certain Defects:

Contrary to the requirements of Rule 5.1(a)(ii) and (iii) PCT, the relevant background art disclosed in document D1 is not briefly stated in the description **In a form so that its relevance to the present application subject-matter may be understood**. It is furthermore not recited in the background art section, but rather **hidden** in that it is mentioned only in connection with the ligand/complex synthesis from page 23 onwards.